LA NINA EFFECTS IN WINTER

Building climate resilience in livestock

Heat detection in pigs

Frost management strategies

CASE CLOSED.

CHOOSE NEW HOLLAND

MAXIMISE VERSATILITY WITH EXCEPTIONAL SUPERIOR POWER

Terms and conditions apply. Structured payment options available. Subject to finance approval. Installation and service fees may be applicable.
The Effects of La Niña during Winter

The 2023-24 El Niño, which peaked during November-January, is gradually weakening according to the World Meteorological Organisation (WMO) Global Centres for Long-Range Forecasts. There was an increasing likelihood of ENSO-neutral conditions for April-June, with only a 10% chance of El Niño persisting during June-August. Some climate models suggest a possible transition from ENSO-neutral to La Niña during June-August.

However, it is important to note that La Niña does not significantly impact Zimbabwe during winter (see Figure 1) i.e. only north-eastern part of Australia show warmer winter. Also it should be noted, no significant rainfall is expected during this period as winter is typically dry in Zimbabwe.

2. Winter Season Forecast:
Winter period in Zimbabwe usually stretches from May to September. In the southern hemisphere, this is the period when the earth slowly tilts away from the sun, reaching its peak tilt during the winter solstices, around 21 June, each year, when the northern hemisphere is in summer. This results in reduced sun energy and lower temperatures. This, however, like rainfall, the effects vary from season to season.

The start of this period, May-July (MJJ) 2024, indicates a high probability of below-normal temperatures. This suggests that Zimbabwe may experience colder conditions during this period compared to the average temperatures for the season. To prepare for the potential impact of the colder temperatures, individuals and sectors should ensure adequate heating and insulation measures are in place.

In contrast, the forecast for July to September (JAS) 2024 suggest the end of winter is expected to be warmer than average. This indicates a shift towards milder temperatures as the season progresses. It’s important to keep in mind that this forecast is specific to the given time frame and may be subject to change as more data becomes available.

Understanding the winter forecast enables policymakers, farmers, and other stakeholders to make informed decisions and take appropriate measures. Farmers can adjust their planting schedules and select crop varieties that are better suited to the expected temperature conditions. Schedules and select crop varieties that are better suited to the expected temperature conditions.

3. Frost Mitigating Measures:
Climate variability has seen the need to venture into climate-savvy agriculture that mitigates the effects of extreme weather conditions. As winter approaches one of the major threats is frost. Some mitigation measures include:

**Irrigation & Sprinklers**

Overhead sprinklers or spray irrigation systems are used to protect plants in a layer of water, insulating them from colder air temperatures.

**Wind Machines**

Large fans or propellers are used to mix warmer air from above with colder air near the ground, which can prevent frost formation.

**Heaters and Smudge Pots**

Portable heaters or smudge pots that produce heat and smoke are placed throughout the crop area, trapping warmer air near the plants, and preventing frost.

**Site Selection and Plant Placement**

Choosing higher elevation, well-drained sites less prone to frost pockets. Spacing plants to allow for air circulation and prevent cold air from settling.

**Row Covers and Fabric Mulches**

Lightweight fabrics or plastics are draped over plants to trap heat similar to greenhouses, creating a microclimate several degrees warmer than the surrounding air.

**Actions to take. Winter Preparedness Policy Implementation:**

1. Weather Forecast Monitoring: Develop a framework to engage key sectors affected by weather and climate, while ensuring policymakers and relevant stakeholders receive accurate and up-to-date information regarding the timing, severity, and duration of cold conditions for proactive action instead of reaction.

2. Frost Protection Measures: Establish guidelines and protocols for implementing frost protection measures. Encourage farmers and agricultural stakeholders to utilise methods such as greenhouse farming, overhead irrigation, wind machines, heaters, and crop protection covers.

3. Irrigation System Maintenance: Establish regulations or recommendations for inspecting and maintaining irrigation systems during winter. Encourage farmers to check for frozen or damaged pipes, valves, and sprinklers. Promote the draining of irrigation systems to prevent freeze damage especially, in frost-prone areas.

4. Livestock Protection: Develop training programmes to teach cold protection measures for livestock; from cows, especially dairy cows, to day-old chicks. Advocate for adequate shelter, bedding, and supplemental heating for animals.

5. Damage Assessment and Recovery: Establish protocols for monitoring and assessing crop and livestock damage after cold snaps. Develop guidelines for implementing recovery measures such as pruning, fertilizing, or replanting. Provide support and resources for farmers to recover from cold-related losses. Public Awareness and Safety Measures during Winter:

Public Awareness and Safety Measures during Winter:

1. Adequate and appropriate dressing: Educate the public about dressing appropriately for cold weather such as hats, scarves, and gloves to prevent heat loss.

2. Time Limitations Outdoors: Raise awareness about the risks of prolonged exposure to cold temperatures, especially late evenings. Educate vulnerable populations, including the elderly, young children, and those with pre-existing medical conditions, about the importance of staying indoors in warm environments.

3. Physical Activity: Encourage the public to engage in physical activity to generate body heat. Promote the avoidance of prolonged periods of sitting or standing still in the cold.

4. Warm Beverages and Foods: Advocate for the consumption of warm, non-alcoholic fluids like tea, coffee, or soup to help maintain body temperature. Promote the importance of consuming warm, nutrient-dense meals to provide energy and warmth.

5. Protection of Vulnerable Individuals: Develop policies that emphasize the protection of vulnerable populations, such as the orphans and homeless, during winter. Encourage regular welfare checks on the elderly, individuals with disabilities, and young children to ensure they are safe and warm.

NB: It is still important to consult experts such as Agritex Officers, Agronomists, and Medical Practitioners for better advice on the actions to take.

The Meteorological Services Department work closely with the Department of Agriculture to develop forecasts in the state of El Niño and La Niña conditions over the coming months and provide updated outlooks, as needed.
Winter Promotion

Spend at least US$100 or ZIC equivalent on agrochemicals or fertilizer in any of our branches & get a free bag of cement.

Promotion runs till 30 June 2024. Terms & conditions apply. E&OE. Prices are subject to change without prior notice. Images are non-contractual.

Your one stop shop!
For all your agricultural inputs & cement.

Our branches:

Bindura
Shop 16 Matty Mall, 310 York Street
+263 66210 7523

Chegutu
79 Abercorn Street
+263 68215 2985

Chinhoyi
2184 ED Mnangagwa Highway
+263 6721 214575

KaroI
114 Industrial Road, Chiedza
+263 61215 6854

MbARE
18917 Roden Street, MagabA
MbARE
+263 77 543 3460

Msasa
521 Access Road, Msasa Industrial Area
Harare
Editor’s Note

WE meet again at a time when we have just completed the transition from summer to winter — a time when cold temperatures will rule the roost. Short days, long nights!

That will be the order of the day for the next two or so months and like everyone else, you farmers also need to shelter from the cold weather. I guess I have to start by paying special tribute to you. You are a special group of citizens who feed us and take care of the land.

Under normal circumstances this should be a time when there is plenty of food. A time when most creatures, both domesticated and wild, can easily reach their full body mass, thanks to enhanced access to food. This time around, there is, however, very little or even none of that because the El Nino phenomenon prowling the earth did not give you the production rights and freedom you need.

I need to appreciate that farming is the hardest work I ever done and I am grateful to have earned my “dirt cred” while gaining an inside view on agriculture. In this month’s note, I will constantly remind all and sundry of the need to give you your kudos because you do not throw in the towel even when seasons change or turn hostile midway through.

You soldier on even with the faintest gleam of hope that your crops will reach maturity and realise the food that we all direly need. Coming out of this El Nino ridden season, one would be forced to think many of you will not have anything to do with crop production next season out, alas, some of you are even busy planting something they will nurse to maturity during this cold winter term.

The exciting thing is that climate scientists have since announced the possibility of a La Nina-influenced season coming hot on the heels of this El Nino-ruined one. La Nina is often associated with abundant rains, flooding and sometimes violent storms. The redeeming factor is the phrase ‘abundant rains’ that most of you want to hear. Abundant rains will essentially fill up reservoirs and make it easy for everyone to access water for various purposes. But, as you revel at the prospects of a fruitful outing this coming season, you also need to make sure you are ready for the predicted kind of weather conditions that will characterise your season and must not be caught at sixes and sevens.

For me, this coming season spurs an appraisal of the past year. Before the cold weather fully sets in, there is a nearly imperceptible pause — before the diversions of the early morning frosts and sometimes a bit of snow in cold regions like Manicaland, let me hasten to remind you to spare a moment or two. If the cold weather fully sets in, there is a nearly imperceptible pause — before the diversions of the early morning frosts and sometimes a bit of snow in cold weather fully sets in, there is a nearly imperceptible pause — before the diversions of the early morning frosts and sometimes a bit of snow in cold weather.

But, as you revel in the prospects of a fruitful outing this coming season, I will constantly remind all and sundry of the need to give you your kudos because you do not throw in the towel even when seasons change or turn hostile midway through.

For all enquiries:
Address: PO Box 596, Corner Sam Nujoma and George Silundika, Harare
Phone: 08677004323, 1265 (1A)2795771
E-mail: ashton.mutyawariri@zimpapers.co.zw
Phone: 0778 239 680
Fildah Gwiriri Phone: 0755 409 516
Reporters:
Ashton Mutyawariri Phone: 0781 239 680
Fildah Gwiriri Phone: 0755 409 516
Design, Layout & Sub Editing:
Editorial Production & Design Department: Tabenda Moyana
E-mail: tabenda.moyana@zimpapers.co.zw
Phone: 0776 615 627
Advertising & Marketing:
Advertising & Marketing Executive: Charles Shungu
E-mail: charles.shungu@zimpapers.co.zw
Phone: 0773 608 227
For all enquiries:
Address: PO Box 396, Corner Sam Nujoma and George Silundika, Harare
Phone: 08677004323, 1265 (1A)2795771

ENJOY!!!

1. Introduction

The traditional mating system practised on most farms involve herd sires (bulls, bucks or rams) running together with breeding females (cows, does or ewes, respectively) throughout the year. This means that cows or ewes are calving or lambing down any time of the year. This approach is more suitable for farmers who prefer a flexible system or have diverse market demands. Downsides to this mating strategy include failure to evaluate herd performance, difficulties in scheduling management operations, labour allocation and synchronizing marketing activities.

2. Implementing a breeding season may bring significant benefits in terms of targeted technical, management and financial benefits to any livestock operation. In this article, we explore these benefits and highlight how a farmer can transition to a breeding season for his cattle, goat or sheep enterprise.

3. Benefits of a breeding season even with all year-round mating, there is a tendency for most of the parturitions to occur during specific times of the year. For instance, if one plots data for number of kids born on a goat farm across the year, the graph is most likely to have two peaks — one in autumn (April-May) and another in spring (September — November). This observed skewed distribution of calving or lambing events on farms, is evidence that animals have natural mating seasons, during which they are most fertile. Seasonal infertility is mediated by nutrition and temperature. Generally, breeding animals are most fertile during periods of abundant pasture and when temperatures are lower.

Breeders need to concentrate conception to a relatively short period of time, for parturition during a period most favorable for conception, offspring survival, and pre-wean growth. This approach optimizes reproductive efficiency, enhances the uniformity of offspring, simplifies herd management, and improves overall productivity.

By aligning the calving or lambing period with the onset of favourable forage supply conditions, producers can maximize the utilization of available forage resources, reduce supplementary feed costs, and facilitate effective herd health management operations.

A defined breeding season helps producers allocate forage and water resources more efficiently. With a breeding season, producers can provide adequate drinking water during critical stages of reproduction and lactation. Furthermore, utilization of limited grazing areas may be optimized.

With a breeding season planning of routine management practices, culling and marketing is simplified. These include pregnancy diagnosis, vaccinations, weaning, dehorning, and feeding, among others.

A breeding season synchronizes the production cycle, opening up new marketing opportunities for larger and more uniform calf or lamb groups. Producers can also offer a consistent supply of market-ready animals to meet specific market demands such as timing, uniformity and a consistency in supply.

Data-driven decisions are easier on a farm that uses seasonal rather than all-year-round breeding. One can easily track calving or lambing rates, and other relevant key performance indicators to assess the effectiveness of their mating program. Because ofseasonal infertility, farmers can have a more or less uniform age and weight, breeding value or index-based selection and culling decisions are easier to make.

3. Transitioning to a breeding season

Transitioning to a defined breeding season can be a strategic decision to improve herd or flock productivity. The farmer needs to critically think through the steps to get where they want to go based on their present situation.
GET READY FOR THE WINTER CROPPING SEASON.
Renew / Get your Agreement today!
Building climate resilience through diversifying crop-livestock systems: The Ukama-Ustawi Project

CLIMATE change continues to exert severe impacts on agriculture, particularly in Eastern and Southern Africa (ESA) including Zimbabwe. The challenges posed by higher temperatures, erratic rainfall patterns, delayed onset of the cropping season, and increased frequency of extreme weather events threaten the very foundation of agricultural productivity in the region. The impact is more severe for smallholder farmers particularly under rain-fed systems. This year, Zimbabwe has witnessed the effects of the El-Niño-induced drought and the season has been so drastic that the Government declared it a national disaster.

Maize, the staple crop for Eastern and Southern Africa including Zimbabwe, is not spared from the negative impacts of climate change. The production of maize faces multifaceted threats, ranging from climate-related yield declines, soil degradation through erosion and nutrient depletion, poor agronomic and outdated practices, and post-harvest losses.

In the face of these challenges, diversification and sustainable intensification in crop-livestock systems emerge as critical strategies to build climate resilience and ensure food security for farming communities.

A drought ravaged maize crop

Diversification in crop-livestock systems refers to the employment of different multi-level strategies aimed at managing risk in crops and livestock agriculture production. At plot level, crop diversification allows farmers to move beyond a single crop to a more balanced cropping system with more than one crop. This offers a range of benefits that include: (i) increased crop productivity due to the inclusion of legumes that can fix atmospheric nitrogen into the soil, (ii) improved food and nutrition security through the inclusion of drought resilient crops such as cowpea and bio-fortified food crops such as vitamin A-rich orange maize, (iii) enhanced animal nutrition by including fodder crops like velvet bean (Mucuna pruriens L.) and lablab [Lablab purpureus (L.) Sweet] in the cropping systems, contributing to overall soil health. Diversifying crops, for example, through crop rotations also disrupts pest life cycles, reducing the likelihood of pest outbreaks that may target specific plants.

In Zimbabwe, the CGIAR Diversification in Eastern and Southern Africa Initiative, also known as Ukama Ustawi (UU), aims to support climate-resilient agriculture and livelihoods in several communities by helping smallholder farmers intensify, diversify, and reduce risks in maize-based agriculture through different interventions such as Conservation Agriculture (CA), crop diversification, small-scale mechanisation and livestock integration. The initiative promotes innovations in value chains while building capacity through improved extension services to scale up to larger farming communities in a gender-sensitive approach. The name “Ukama Ustawi” beautifully captures the essence of this project – the connection between humanity, the environment, and our collective well-being.

Under the Ukama Ustawi initiative implemented by multiple partners of the CGIAR (www.cgiar.org), The International Maize and Wheat Improvement Centre (CIMMYT) collaborates with the Ministry of Lands, Agriculture, Fisheries, Water and Rural Development which coordinates the efforts through its Agronomy Research Institute (ARI). The initiative’s focus on evidence-based climate-smart solutions such as CA is in line with the Government of Zimbabwe’s thrust to build climate resilience among smallholder farmers and boost food security through the Pfumvudza/ Intwasa initiative as outlined in National Development Strategy 1 (NDS1) in the quest to achieve vision 2030. The UU initiative is being implemented in six districts across Zimbabwe, namely Madziwa, Shamva, Bindura, Mutoko, Murewa and Masvingo. In these districts, the initiative tests and validates different climate-smart cropping systems through mother-and-baby trials and innovation trials. The tested and validated cropping systems include maize-legume intercropping, maize-legume rotations (with or without Brachiaria grass hedgerows), and interaction of maize genotypes and soil management. Further, the initiative integrates forage legumes and grasses such as lablab, velvet bean and Brachiaria to provide an opportunity for farmers to improve livestock feed production. This underscores the commitment to innovation and development crop-livestock systems that anchor smallholder agriculture in Zimbabwe. The initiative promotes appropriate-scale mechanisation of the farmers’ value chains, from production to post-harvest processing and this is achieved through a service provider (SP) model. The Service Provider model helps farmers obtain bank loans, allowing them to pay a portion of the mechanisation package upfront and the remainder in instalments as they use the equipment. This package includes a two-wheel tractor, a trailer, and a multi-crop thresher.

Stakeholders at a field day in Shamva observing lablab with Brachiaria grass hedgerow

In addition, the UU initiative acknowledges the pivotal role of women and youth in agriculture. Women, constitute more than 50% of the agricultural labor force in Africa and are central to ensuring family food and nutrition security. Yet, they continue to face significant gender disparities in access to resources affecting their productivity. Similarly, youth represent the future of agriculture in our region, and empowering them with the necessary skills and adaptation options is key for sustainable development. Through partnering with farmers, particularly women and youth and linking them with the private sector, the UU initiative seeks to unlock the potential of smallholder farmers, empower agricultural businesses, and promote inclusive growth and foster resilient agribusiness ecosystems.

1. Dr Tariro Gwandu is the Head of Agronomy Research Institute, Ministry of Lands, Agriculture, Water, Fisheries and Rural Development

2. Dr Blessing Mhlanga is a Cropping Systems Agronomist with CIMMYT

3. Dr Christian Thierfelder is a Principal Cropping Systems agronomist with CIMMYT

Stakeholders at a field day in Shamva observing lablab with Brachiaria grass hedgerow
UPDATE ON WATER AVAILABILITY FOR THE 2024 WINTER CROPPING SEASON

The Zimbabwe National Water Authority (ZINWA) wishes to advise farmers and all winter cropping stakeholders that the country has sufficient water in the dams to meet the 2024 winter cropping requirements. As of May 6, 2024, the national dam level average stood at 77%, against an average of 71.2% expected during this time of the year, with national dams and other sources holding sufficient water to irrigate a total of 141 000 hectares of land based on verified installed irrigation capacity ranging from 5ML/Ha to 7ML/Ha depending on agroecological region, type of irrigation and other factors.

The government has set a target of at least 120 000 hectares to be put under winter wheat during the 2024 winter cropping season. In view of this development and to ensure the effective and sustainable harnessing of the available water resources, all farmers and other entities wishing to irrigate during the season are advised to sign water abstraction agreements with ZINWA.

Agreements allow ZINWA to efficiently allocate and make water reservations for farmers in the Dams. Farmers should thus approach their nearest Catchment and Provincial Offices for water allocation modalities and further assistance on the following numbers:

- Mashonaland West; Eng Tendai Muyambo- 0772 515 246
- Mashonaland East and Central; Eng Gift Ziweya- 0785 581 454
- Manicaland; Eng P. Nyahora- 0772 761 441
- Midlands; Eng P. Gundani- 0773 742 899
- Masvingo; Eng S. Nazombe- 0772 395 060
- Matabeleland South; Eng A. Manyeka- 0773 586 065
- Matabeleland North; Eng H. Tobve- 0775 123 090

Farmers are strongly encouraged to work closely with Agritex in determining their crop water requirements for the season.

In line with the Government thrust of promoting irrigation water uptake and supporting increased production on the farms, the ZINWA shall be implementing seasonal billing for all A2 farmers on stop order facilities with funders or off-takers of their produce. Farmers are thus advised to take full advantage of this arrangement.

ZINWA is also disturbed by increasing incidences of vandalism of irrigation water conveyance infrastructure, power supply components and infrastructure; a development that threatens the country’s food security efforts. The public is advised to report any acts of such vandalism to the police or the ZINWA.
Heat detection in pigs

DETECTION of heat is critical in pig pro-
duction as it is only possible to breed
when the female is on standing heat.
The stockman plays an important role in
detecting heat as besides using a boar for
detection there are several signs which the
stockman can observe which aid breeding
the sow at the right time either naturally
or using artificial insemination. It thus
becomes imperative that the stockman
need to know the symptoms of heat as they
progress.

Errors in heat detection can result in
reduced productivity as low litter sizes can
arise or there will be more unproductive
(lost) days as the female will only be bred
when it recycles. It has to be borne in mind
that the boar is not housed in the same pen
with females as breeding is controlled and
has to be monitored.

Signs of heat

Oestrus is the period when the sow is
sexually receptive and ovulates (release
eggs). It is this period that it can conceive.
First oestrus occurs at about 170-210 days
of age in gilts that have been stimulated by
a boar. In sows weaned in good condition
they can cycle (come on heat) within 3-10
days after weaning. Oestrus usually lasts
40 hrs in gilts and 55 hours in sows though
it can vary between 12-84 hours. Ovulation
occurs at around two thirds into oestrus,
that is 30-40 hours after onset of heat. The
oestrus cycle is 18-24 days with an average
of 21 days.

Signs that can be observed

The female can show behavioural signs
and also there are physical changes that
occur. It has to be noted however that not
all symptoms are apparent in all females
and also intensity of the changes varies
among females, breeds and the
breeding herd.

Below are the signs which may be
observed

Swelling and reddening of the vulva

Two to 3 days before oestrus, oestrogen
levels increase as a result of the develop-
ing ovarian follicles. This will stimulate
increased blood flow and water retention in
the reproductive tract and cause the vulva
and clitoris to swell and turn red and pro-
trudes. If not in standing heat the clitoris is
flat and has same pink light colour as the
lining of the vulva This sign is more appar-
ent in gilts. In sows the vulva needs to be
parted so that the clitoris is seen.

Reddening of the vulva reaches a peak
and begin to subside 24-36 hours before the
pig is on standing heat

Oestrogen also affec-ts some sites in the
brain that will cause the animal to exhibit
some changes in vocalisation, can become
off feed and it has interest in mounting
other pigs if staying in a group.

It is important to have the pigs showing
such changes noted and they will be
observed on the next heat checks.

Mucous discharge

The female releases clear oily mucous
as the level of oestrogen increases. The
mucous becomes cloudy and sticky during
standing heat. A sample can be collected on
the thumb and pressed between fingers to
test on the degree of stickiness. The mucous
becomes sticky as the sow approaches oes-
trus. Redding can stick on the vulva as a
result of the mucous.

Tail

Females not in heat clamp their tail
down when the vulva is checked. Those in
heat will usually raise their tail and quivers.

Mounting other pigs

Females coming into heat or finishing
heat usually mount other females if they
are group housed. If it stands still when
ridden, then that will be a sign of heat as
well. Those not on heat will loudly vocalise,
as they try to move away

If the females are individually housed,
then they will try to bite others next to
them or try to mount the crate when a boar
passes to express its interest.

Seeking the boar

A female on heat will show an increased
interest when exposed to a boar.

Standing reflex

When a boar passes a female may show
standing reflex. Ears in some breeds become
erect, arch their back and brace their legs as
a preparation sign to be mounted.

Back pressure test

Presence of a boar during heat detection
is critical as some females won’t show any
behavioural signs. Nose to nose orien-
tation is important as the female will see,
smell and hear the boar. Boars normally
nudge the flank and underline the female
before mounting. The same can be prac-
ticed by the stockman by applying firm
hand strokes around applying back pres-
sure by hand or mounting on the female.

Back pressure test- If on heat the pig
stands still when mounted

To conclude, proper heat checks increase
productivity because non-productive days
are kept in check and errors quickly cor-
rected. The females will be bred at the right
time thereby increasing chances of opti-
mising the litter size. Stockman who work
in the breeding section should be patient
and observant and there is need to ensure
that they are properly trained.

Compiled by the Pig Industry Board
**Bees part of sustainable apiculture production**

Practical Approaches to Pollinator-Friendly Agriculture

1. **Plant Diverse Flowering Habitats:** Creating diverse, pollinator-friendly habitats within and around farmlands can provide vital food and nesting resources. Planting native wildflowers, cover crops, hedgerows and flowering field margins helps attract and sustain diverse pollinator species throughout the year. This approach enhances biodiversity, strengthens ecosystem resilience, and fosters natural pest control.

2. **Minimise Pesticide Use:** Adopting integrated pest management (IPM) practices can reduce pesticide reliance and protect pollinators. Precision application techniques, using alternative pest control methods, and selecting less toxic pesticides can minimize risks to pollinators while maintaining crop health.

3. **Provide Nesting Sites:** Pollinators require suitable nesting sites to reproduce and overwinter. Farmers can create nesting habitats by leaving patches of undisturbed soil, installing bee hotels, or incorporating specific structures for cavity-nesting bees and solitary wasps.

4. **Optimise Crop Rotation and Diversification:** Crop rotation and diversification enhance soil health, reduce pest pressure and support pollinators. By avoiding continuous monoculture, farmers can create a more favourable environment for pollinators and beneficial insects.

5. **Raise Awareness and Collaborate:** Engaging in community outreach programs, educational campaigns, and partnerships with conservation organizations can raise awareness about the importance of pollinators. Sharing knowledge, experiences, and best practices among farmers, researchers, and policymakers can foster the widespread adoption of pollinator-friendly agricultural practices.

Zimbabwe joined the world on 20 May to celebrate the World Bee Day. The main objective was to raise awareness among youth and other stakeholders about the essential role of bees and other pollinators in agriculture, ecological balance, and biodiversity preservation. Activities included field days, bee march and public lectures on apiculture.

**Tips on starting beekeeping**

Starting beekeeping can be an exciting venture! Here are some tips to help you get started:

- **Research and understanding is the best way to start any project.** Understand the basics of beekeeping, including hive management, pest control and legislation (Bees Act, Chapter 19:02). Take a beginner’s beekeeping course to gain hands-on experience and knowledge from experienced beekeepers.
- **Join a local beekeeping association to connect with local beekeepers, attend meetings, and learn from their experiences.**
- **Invest in quality equipment including a hive, protective clothing, and basic tools.**
- **Choose the right location to set up an apiary.** Select a safe location for your bees, considering factors like sunlight, wind protection, and proximity to neighbours.
- **Start with a few hives and expand as you gain experience.**
- **Regularly inspect and maintain your hives.** Monitor your bees’ health and control pests.

- **Be patient and persistent because beekeeping requires dedication and flexibility.** Be prepared to face challenges and learn from your mistakes.

- **Respect and care for your bees.** Always prioritize the health and well-being of your bees, and enjoy the rewards of this fascinating hobby!
Inside the flourishing world of high-performing Wonderful Farm

As one approaches the farm from the direction of Harare, he is greeted by the earthy scent of freshly turned soil mingling with the pleasant aroma of semi-ripening tomato and green pepper fruits, creating a harmonious symphony of sights, smells and sounds that speak to the abundance and vitality of a bountiful harvest to come.

That is Wonderful Estate for you — a sub-division of Pimento Farm that sits on 36 hectares, 25 of which are arable and being used for cropping activities. It belongs to Mr Prince Wonderful, hence the name Wonderful Farm.

And, indeed, the assortment of vegetable crops currently populating the farm present the sojourner with a magnificent spectacle from its vibrant tapestry of colours, as they unfold across the field with the lush green leaves of rape, covo and bulging cabbages swaying gently in the mild breeze.

Rows of tomato plants juxtaposed against similar rows of green pepper add a touch of whimsy to the scene.

The gate to the farm is just a few metres off the road, which makes the farm easy to access for would-be customers.

This news crew recently chanced to pass by the farm and could not resist the temptation to stop and interact with the people behind the greenery we were seeing. The owner of the farm and pastor by calling, Mr Wonderful was away but duly instructed his farm manager Mr Dinanda Paulosi to attend to us.

“Welcome to Wonderful Farm. I hope you will appreciate that we are still trying to get into the groove, as a new establishment here but we are doing our best. We are currently doing crop farming on 29ha although at the moment we have horticultural crops only. Our green meals just got finished,” said Mr Paulosi as he gave us seats.

He explained to us that the current greenery on the farm comprised 4,000 green pepper, 6,000 tomato and 4,000 cabbage plants. There are also leafy vegetables like rape, covo, tsunga and cabbages that are almost ready for the market.

“We sell our produce to large supermarkets such as Choppies and Pick N Pay in Bindura. Some of the vegetables go to tertiary institutions like Bindura University of Science Education (BUSE) and Zimbabwe Ezekiel Guti University (ZEGU) and schools. In Harare we also trade with supermarkets like Choppies, Windgove and Food Lovers Market to name a few.

“Our market also includes the usual ‘walk-in’ buyer that comes to buy from here while there are vendors and family people that come to buy directly from the farm here,” said Mr Paulosi.

I asked him to share what makes their produce so popular with consumers to the extent that they get buyers from as far afield as Harare to which he answered that the quality of their produce did the trick.

“The quality of our products is just appealing. Everyone who sees them will always want to get a feel of them and taste them. We pay very close attention to the selection of vegetable varieties that we produce here. Every successful farmer starts with the right seed variety and the proper agronomic practices. Our vegetables are produced using organic inputs mostly, which gives them a very good taste,” added the soft-spoken Mr Paulosi.

And true to his sentiments, the man is very conversant with the crop varieties that he is growing on the farm, at the moment he has the Trinity and 90327 tomato varieties, the Ganga variety for green pepper, 3301 for cabbages, Rampant for rape, Paida for tsunga, covo gold and covo rugare. These are high performing varieties, which always hold the market spellbound once they are ready for consumption, according to Mr Paulosi.

At the moment, they have already started rolling out some of their future plans with a greenhouse sitting on one and a half hectares already set up. They have planted the English cucumbers of the Bologina variety, which are almost at the fruit bearing stage. To take care of possible shortages of water in the event that their borehole develops a malfunction or runs dry, they have constructed a water reservoir that draws water from Mazowe River about 11 kilometres from the farm.

“The construction of the water reservoir will allow us to expand our hectarage and include other crops that we have not been producing. We are not targeting to produce sugar beans on five hectares, soya beans on 15 hectares and will reserve six hectares for green meals, which we will later use for other purposes after drying.

“We are also targeting to grow tomatoes of the Candella and 9097 varieties in the greenhouse so that we do not allow a gap during which we will not be supplying the product on the market. The availability of water will also enable us to grow potatoes this coming season,” added Mr Paulosi.

To make their dream of maintaining a grip on the market, they are also planning to secure more irrigation equipment to make sure they expand from their current three hectares of land under irrigation to a bigger space. They also intend to start producing water melons and butter nuts and build a green grocery at the entrance to the farm so that customers who do not want to come into the farm can just buy from there and go.

Mr Paulosi observed: “Our ultimate goal is to establish some cold chain facilities and start producing even for export markets. We are already using good agronomic practices (GAP) here so exploring external export markets will not be difficult.”

Their final dream is to secure another tractor, a disc harrow, sprayer, trailer, planter, disc plough to up production. They have six permanent workers and always hire extra hands during the busiest times.

“I cannot wait for that day when we start value adding our produce and selling it at higher prices than we are currently quoting. Value addition is our biggest dream and we are surely going to start it very soon,” said Mr Paulosi.

Source: Inside the flourishing world of high-performing Wonderful Farm

ZIMPAPERS
How crop farmers can prepare for winter

Lerato Botha is a director and production manager at the newly established Farmerlee Farms.

Agronomist Lerato Botha shares her expertise on why it is important to prepare your land for the winter and gives some advice to crop farmers on how to deal with the cold season.

Botha advises that if you plan on planting during the winter, choose a crop that has a high cold tolerance. There are not many crops that can take the cold and not many crops recover after being affected by frost. So, it is important to understand the type of crop that will be planted.

What types of crops can be planted?

For colder months, brassicas are the crop of choice:
- Broccoli
- Cabbage
- Cauliflower
- Brussels sprouts

There are also green bean varieties that can be grown in winter:
- Celery
- Leeks
- Turnips

Use of cover crops

“Usually, farmers in the colder regions would plant the crop cover. A crop cover is a variety of nutrient intense crops that will help rehabilitate your soil in the winter.

These crops don’t usually get harvested, usually, they will be ploughed back into the soil and this is what we would call green manure. We use this time — which is about three to four months of winter — to prepare your soil for the coming season,” she says.

A lot of farmers follow the following techniques for winter:
- Use the time to rehabilitate the soil.
- Spread those seeds across your field and plant them densely.
- Water plants often.
- Plough it closer to planting time.

However, farmers in the warmer regions are lucky enough to still grow and harvest crops during winter.

Botha says: “You would then find that farmers would grow a crop that replenishes the soil. Something like beans, most bean varieties replenish the soil. They put nutrients back into the soil so you will come and find that a lot of farmers would plants beans because it is very stable on the market with regards to price.”

As much as you are planting something, there is an opportunity to harvest as well and get some money back from the winter planting.

Irrigation and water systems

What a farmer needs to take into consideration is the frequency of irrigation and the time that they irrigate during winter.

“You need to ensure that the crop has defrosted in the morning. Let’s say you are in a region where you are frost prone. You will then wait for the morning dew to dry out before you irrigate,” she explains.

This is done because farmers do not want to add water to a cold plant. It will take longer to defrost and the growth for that day will not be much. Therefore, it is important to wait for the dew to dry up. Once that has happened, at around 10:00-11:00 the irrigation process can start.

Botha advises against irrigating too late in the day.

“If you irrigate later, the water turns to frost in the evening. You want to avoid your plant from getting frozen the night. Try and irrigate midday latest; you can push for 14:00 or 15:00 in the afternoon,” she says.

The effect of nitrogen

Nitrogen promotes root development which in turn promotes plant growth, Botha explains.

“By choosing a cold-tolerant crop variety it means that you will have a good quality product in winter. But it does not mean that it will grow quicker, but whatever you will harvest will be of good quality,” she says.

If you do not plant a cold-tolerant variety, what you will get is stunted growth. Crops that do develop fruit, will therefore be of poor quality and smaller in size.

Top tips for farmers to prepare land successfully for winter:
- Thoroughly plan what you will be planting (if it needs to be harvested etc.).
- Take advantage of your late summer and early autumn season for sunlight.
- Understand the temperature in your region.
- Understand your market and the crop that can be harvested during winter.

Weather conditions are harsh in the cold months and farmers need to prepare their operations for any extreme conditions. Photo: Supplied/Food For Mzansi
Frost poses a significant threat to crop production, particularly in regions prone to sudden temperature drops in Zimbabwe. Damage caused by frost can result in substantial economic losses for farmers. Effective frost management strategies are therefore essential to safeguarding crop yields and ensuring effective food security. This article explores various methods and techniques used in frost management in crop production.

Understanding Frost:
Frost occurs when temperatures drop below freezing, causing ice crystals to form on plant tissues. This can lead to cellular damage, wilting, and even death of sensitive crops. Frost events are often unpredictable and can occur during critical stages of crop development, such as flowering and fruit set, amplifying the risk to yield and quality.

Frost Management Techniques
Site selection and microclimates:
Choosing well-drained sites and locations with good air drainage can help mitigate the risk of frost damage. Planting crops on elevated terrain or near bodies of water can create microclimates that are less prone to frost.

Planting crops in greenhouses and sheds.

Crop selection:
Planting frost-resistant crop varieties that have adapted to withstand cold temperatures can reduce vulnerability to frost damage. Breeding programmes focus on developing cultivars with improved cold tolerance traits, such as late-flowering or early-maturing varieties.

Timing of planting and harvest:
Scheduling planting dates to avoid frost-prone periods can minimize the risk of exposure to damaging temperatures. Similarly, timing harvests to coincide with periods of lower frost risk can help protect crops from late-season frost damage.

Irrigation:
Using irrigation to apply water can help mitigate the effects of frost by providing a protective layer of ice that insulates plant tissues. Sprinkler irrigation is commonly used, as the latent heat released during the freezing process can help maintain temperatures above critical levels.

Frost Protection Covers:
Frost blankets, row covers, or plastic tunnels can be deployed to physically shield crops from frost. These covers trap heat radiating from the soil and reduce heat loss from the plants, creating a warmer microclimate beneath them.

Mulching
Mulching is a widely used and effective technique for frost management in crops. This method involves covering the soil around plants with a layer of organic or synthetic material, such as straw, hay, leaves, plastic, or fabric, to provide insulation and protect the roots and lower stems of plants from freezing temperatures.

Over all, mulching is a versatile and cost-effective strategy for frost management in crops, offering multiple benefits beyond frost protection, including weed suppression, soil health improvement, and erosion control. By incorporating mulching into their farming practices, growers can minimize the risk of frost damage and optimize crop yields, contributing to sustainable and resilient agricultural systems.

Using amino acids and seaweed for frost management in crops is a relatively novel approach that harnesses the natural properties of these substances to enhance plant resilience to cold stress. Amino acids, as building blocks of proteins, play essential roles in plant growth and development, while seaweed extracts are rich in nutrients, hormones, and bio-stimulants that promote plant vigour and stress tolerance.

Combining amino acids and seaweed extracts for frost management can provide synergistic benefits, as each substance complements the other’s mode of action. Amino acids enhance plant metabolism and stress response mechanisms, while seaweed extracts provide essential nutrients and bio-stimulants that support overall plant health and resilience.

Application methods for amino acids and seaweed extracts in frost management can include foliar sprays, soil drenches, and seed treatments. These treatments are typically applied before anticipated frost events to prime plants for cold stress and minimize damage.

Smoke
Frost management using smoke is a traditional method employed by farmers to protect crops from freezing temperatures. This technique involves creating a layer of smoke near the ground, which acts as a barrier against radiative cooling, thereby raising temperatures within the crop canopy and reducing the likelihood of frost damage. Smoke can also help break up temperature inversion layers, which occur when cool air becomes trapped near the ground by warmer air above, exacerbating frost formation.

To implement smoke for frost management, farmers typically burn organic materials such as straw, wood chips, or crop residues in designated areas around their fields. The smoke generated from these fires creates a layer of particulate matter in the air, which absorbs and re-radiates heat back to the ground. This process effectively raises the temperature within the crop canopy and prevents frost formation on plant tissues.

However, it’s important to note that smoke as a frost management tool has limitations and potential drawbacks especially to the environment. For instance, excessive smoke can pose air quality concerns and may have adverse effects on human health and the environment. Additionally, the effectiveness of smoke as a frost management technique can be influenced by factors such as wind direction, atmospheric stability, and the size and intensity of the fire.

Frost management in crop production requires a combination of proactive planning, technology, and agronomic practices to minimize the risk of frost damage. By employing strategies such as site selection, crop selection, timing of planting and harvest, irrigation, frost protection covers, and wind machines, farmers can effectively mitigate the impact of frost events on crop yields and ensure the sustainability of agricultural production systems.

Continued research and innovation in frost management techniques are essential to address the challenges posed by climate variability and ensure food security in the face of changing environmental conditions.

Kundayi Zvaraya is an agronomist and founder of Farm Makeover Company +263 78 407 2644
GETTING your blueberry soil pH right is key to growing healthier and more productive plants.

Ensuring you have the right blueberry soil pH is an essential part of enjoying an abundant harvest of sweet, juicy berries. Most gardens have a relatively neutral soil pH of around 6.0 to 7.0 but blueberries grow best when the soil is on the acidic side with a pH between 4.0 to 5.5. Growing acidic soil-loving blueberries outside of this pH range can result in stunted shrubs with minimal berries, yellowing leaves, and other signs of nutrient deficiencies.

Use these tips to adjust soil pH levels before planting blueberries or to change the soil pH around existing blueberry plants to the ideal range. Keep in mind that it’s easier to modify soil pH before planting because you don’t need to work around established plant roots.

1. Choose the right growing location.
While you can adjust garden soil with various amendments, it’s much easier to grow blueberries in locations that are already well-suited for acid-loving plants. Look around your garden and see if there’s an area that fits the specific conditions blueberries need to grow. Full sun to part shade locations with acidic, sandy loam soils that are well-draining are ideal for growing blueberries.

2. Do a soil test.
Soil tests are recommended no matter what plants you want to grow, but they’re particularly useful with blueberries. Blueberries are picky about their soil, and soil tests let you know if your soil needs adjustment and which amendments to use. Soil tests can be performed at home, but you’ll get more accurate results using a soil test kit from your local cooperative extension office.

3. Consider raised beds or container growing.
As useful as soil amendments are, soil acidifying products can only alter soil pH levels to a certain degree. If your soil pH is over 6.5, it may be easier to grow blueberry plants in large containers or raised beds. If you go this route, choose containers that are at least 61 centimetres deep by 76 centimetres wide and fill them with potting mix or raised bed soil specially designed for acid-loving plants.

4. Plan ahead when lowering pH.
Elemental sulphur is commonly used to lower soil pH, and it is approved for organic growing. However, sulphur takes a few months to start working and should be applied six months to one year before you intend to plant blueberries. One way to use sulphur is to apply sulphur treatments in autumn and plant blueberry shrubs the following spring.

5. Apply elemental sulphur.
Elemental sulphur usually comes in powder form, which can be applied by hand or with a broadcast spreader. If you’re preparing a new planting spot, spread sulphur over the ground and work it into the top 6 to 8 inches of soil with a shovel or tiller. If you already have blueberries growing in your garden, sprinkle sulphur over the soil around the base of the plants.

6. Adjust soil pH slowly.
A single application of sulphur can lower soil pH by 1.0 point, but if your soil pH is very high, you may need to apply a second sulphur treatment six months after the first application to drop the pH levels down even further.

7. Add organic matter.
Elemental sulfur reduces soil pH levels, but sulphur products need to be reapplied from time to time. When it rains or you water your garden, sulphur amendments wash away little by little. Over several years, soil pH levels can become alkaline again. Slow down this process by mixing compost or other organic matter into the soil when you add sulphur.

8. Use fertiliser for acid-loving plants.
Blueberries fruit more abundantly when they’re fertilised at least once a year. You can provide blueberry plants with the nutrients they need and keep the soil acidic by using fertilisers especially designed for acid-loving plants. These fertilisers naturally lower soil pH and contain nutrients that are difficult for blueberries to absorb in high-pH soils.

9. Monitor soil pH.
Using elemental sulphur in conjunction with organic matter and fertilisers intended for acid-loving plants keeps soil pH levels down and makes your garden more hospitable to blueberries. If your garden isn’t naturally acidic, pH levels will creep back up eventually, so test the soil around your blueberries annually to know whether the pH levels have changed and you need to add more sulphur.

Lauren Landers is a freelance writer who focuses on gardening, homesteading, and DIY. Learning from both hands-on experience and a Master Gardener training course, Lauren loves sharing her knowledge about gardening, conscious living, homesteading, backyard food growing, and much more.
MOISTURE conservation in horticulture refers to the practice of managing and preserving soil moisture to ensure optimal growing conditions for horticultural crops. It involves various techniques and strategies aimed at reducing water loss from the soil and maximising water availability for plant growth. Moisture conservation is crucial in horticulture as it is key to improving crop productivity, reduce water usage, and promote sustainable farming practices. Here are some common moisture conservation practices used in horticulture:

Mulching. — Mulching is a widely used technique in horticulture to conserve soil moisture. Organic mulches such as straw, bark, leaves, and grass clippings are spread on the soil surface around plants to reduce evaporation, suppress weed growth, and maintain soil moisture levels. Mulches also help to regulate soil temperature and improve soil structure over time.

Water-efficient irrigation techniques. — In addition to drip irrigation, other water-efficient irrigation techniques such as micro-irrigation systems, soaker hoses, and watering timers can be used in horticulture to conserve moisture and optimise water distribution to plants. These techniques help to minimise water loss and ensure that plants receive adequate moisture for their growth and development.

Cover cropping. — Cover cropping involves planting specific crops during periods when the main crops are not growing to cover and protect the soil. Cover crops help to reduce soil moisture evaporation, prevent erosion, and improve soil health. They also contribute organic matter to the soil when incorporated, enhancing its water-holding capacity.

Rainwater harvesting. — Rainwater harvesting systems can be implemented in horticultural settings to collect and store rainwater for irrigation purposes. Capturing rainwater allows growers to conserve water resources, reduce reliance on external water sources, and maintain soil moisture levels during dry periods.

Soil amendments — Adding organic matter such as compost or manure to the soil can improve its water-holding capacity and enhance moisture retention. Organic amendments help to increase soil porosity, promote root development, and reduce water runoff, leading to better moisture conservation in horticultural crops.

Proper crop spacing and planting density. — By optimising crop spacing and planting density, horticulturists can reduce competition for water among plants and ensure efficient water use throughout the growing season. Proper spacing allows plants to access adequate moisture without excessive competition, leading to improved water utilisation and crop productivity.

Moisture conservation is crucial for small-scale farmers as it can bring several benefits to their farming operations. Here are some of the key benefits of moisture conservation for small-scale farmers:

- Improved crop yields. — Moisture conservation techniques such as mulching, cover cropping, and rainwater harvesting help to retain soil moisture levels, which can lead to improved crop yields. Conserving moisture ensures that crops have a more consistent water supply, especially during dry periods, which is essential for healthy plant growth and higher yields.
- Reduced water stress. — By conserving moisture in the soil, small-scale farmers can help reduce water stress on their crops. This is particularly important in areas where water availability is limited or unreliable. Moisture conservation techniques help to ensure that crops have access to water when they need it most, reducing the risk of water stress and crop failure.
- Soil health improvement. — Conserving moisture in the soil can contribute to improved soil health. Adequate soil moisture levels help to maintain soil structure, promote microbial activity, and support nutrient availability for plant uptake. Healthy soil is essential for productive and sustainable farming practices.
- Reduced erosion. — Moisture conservation techniques such as mulching and cover cropping help to protect the soil from erosion caused by wind and water. By maintaining soil moisture levels and preventing runoff, small-scale farmers can reduce soil erosion, which can preserve soil fertility and prevent land degradation.
- Cost savings. — Effective moisture conservation practices can help small-scale farmers reduce their irrigation and water costs. By utilising natural water sources more efficiently and reducing water losses through evaporation and runoff, farmers can save on water expenses and improve the overall sustainability of their farming operations.
- Climate resilience. — Moisture conservation in horticulture can help reduce the need for frequent irrigation in horticultural crops. By maintaining soil moisture levels through practices like mulching and cover cropping, farmers can increase the resilience of their reliance on external water sources and irrigation, saving both water and energy resources.

Soil health improvement. — Conserving moisture in the soil contributes to improved soil health in horticultural systems. Adequate soil moisture levels promote microbial activity, enhance nutrient cycling, and maintain soil structure. Healthy soil supports plant growth, increases resistance to diseases, and enhances overall crop productivity.

Erosion prevention. — Moisture conservation practices such as mulching and cover cropping help protect the soil from erosion caused by wind and water. By maintaining soil moisture and structure, horticulturists can prevent soil erosion, preserve valuable topsoil, and maintain soil fertility for sustainable crop production.

Climate resilience. — Implementing moisture conservation techniques in horticulture can enhance the resilience of crops to climate variability and extreme weather events. By improving water management practices and soil moisture retention, farmers can better withstand droughts, floods, and other climate-related challenges, ensuring the long-term sustainability of their farming operations.

Cost savings. — Effective moisture conservation practices can lead to cost savings for horticulturists by reducing water, energy, and input expenses. By adopting water-efficient irrigation methods, using rainwater harvesting systems, and implementing other moisture conservation techniques, farmers can lower their production costs and improve the economic viability of their operations.

Overall, moisture conservation in horticulture plays a critical role in promoting sustainable farming practices, enhancing crop productivity, and mitigating environmental impacts associated with water use in agricultural systems. By prioritising moisture conservation, horticulturists can achieve better crop performance, resource efficiency, and long-term resilience in their farming operations.

Desire Tavengwa is a Freelance Agronomist
+263777609574
DEFINITION of postharvest handling:
Post-harvest handling is the stage of crop production immediately following harvest. It involves stages such as drying, shelling, cleaning, sorting and packing.

Post-harvest technology involves all treatments or processes that occur from time of harvesting until the foodstuff reaches the final consumer.

Why crops are harvested at the correct physiological maturity
• To respond and complement physiological maturity stage in the crop production cycle
• To ensure food security at home through facilitating storage and processing
• To recycle nutrients through the soil
• To maintain quality and quantity of the produce
• To exploit economic benefits of produce in various forms
• To supply both humans and animals with food

Importance of post-harvest handling:
• To preserve final quality of our produce
• To avoid moisture loss
• To slow down undesirable chemical changes
• To avoid physical damage such as bruising
• To delay spoilage

Post-harvest handling problems with legumes:
• Pod shattering
• Labour intensive selective hand picking
• Damage by rodents or birds

Post-harvest losses may occur in the following areas:
• At physiological maturity (caused by weed and termites, rodents, domestic and wild animals, birds, rainfall or micro-organisms)
• During harvesting (scattering and mechanical damage due to poor handling and excessive drying)
• During transportation (spillage, scattering and mechanical damage)
• During drying (rodents, domestic animals, microbes, spillage, overheating)
• During threshing (spillage, incomplete threshing/shelling and mechanical damage)
• During processing (spillage, mechanical damage)
• During storage (insects, rodents, micro-organisms or respiration)
• Processing (spillage, nutritional loss or overheating)

Losses may be in form of:
Quantity: Split seed, running out of damaged bags, theft, damage by pests
Quality: Changes in moisture content of stored grain

Purity level: This refers to the absence of foreign materials in grain such as stones, rotten grains, broken or discoloured grains. Most buyers prefer groundnuts with 95 per cent level of purity.

Moisture content: The level of moisture in the grains as measured by a moisture meter.

The best quality groundnuts should have a moisture content of 7-8 percent. Groundnuts with moisture content either above or below the given range are considered to be of poor quality.

Shellling percentage: This means that when shellling, at least 65 percent of the weight should be grain weight while the other 25 is trash.

A lower percentage shows poor quality groundnuts with high deficiencies of calcium during pelleting stage.

Damage: The damage refers to the proportion of groundnuts that are mechanically or physically damaged (cracked, broken) during the post-harvest handling process.

Aflatoxin: These are poisonous substances produced by fungi and make the grain unfit for consumption. Good quality groundnuts should be Aflatoxin Free.

FUNDAMENTALS OF POST-HARVEST HANDLING

Drying
Wiling: Plants should be removed in windrows to allow them to wilt before curing. Seed moisture content at lifting usually exceeds 35 percent and this period of wilting is necessary to allow rapid initial moisture loss from pods and vegetative plant parts.

Pods lying in contact with the soil are exposed to high temperatures; during wet weather, they may remain wet for long periods.

In inverted windrows, air circulates around the pods, allowing them to dry rapidly after rain showers.

Under ideal conditions safe moisture levels are reached in 5-7 days. During hot weather the period is less. If weather is not very hot, keep the groundnuts in windrows for 10 days. In cool weather keep them longer. The cock is used for wilting.

Curing: After two to three days of wilting it is safe to begin natural curing, provided the following factors are taken into account:

Shade: exposure to direct sunlight results in deterioration in quality. Plants should be stacked with pods innermost and foliage outermost.

Ventilation: ensure good drainage to avoid loss from pods and vegetative plant parts.

Drainage:

Shade:

To respond and complement physiological maturity stage in the crop production cycle

Storage of groundnuts is done in the form of windrows and cocks being spoiled by damage to pod by Nematodes

Rotting of stem, root and pods

Damage of pod for instance growth cracks

End of season moisture stress to crop for a period of more than 20 days

Factors promoting contamination by Aflatoxin

Pre-harvest:

End of season moisture stress to crop for a period of more than twenty days

Damage of pod for instance growth cracks

Post-harvest:

Harvesting when the crop is over mature

Stacking the produce when moisture levels are high

Insect damage during storage

Separate discoloured, shrivelled and damaged pods at shelling

Store pods under dry conditions in cool and well-ventilated storage facilities

Follow proper drying procedures

Remove soil from pods before drying

Good curing practices

Storing Haulms with immature pods

Stacking the produce when moisture levels exceed three percent, eight percent

Apply Actellic super on unshelled pods

Do not store in plastic bags (polythene bags) as they do not allow air circulation and promote fungal infection

Apply Actellic super on unshelled pods before storage

Shelling:

Groundnuts shellling should be done only when the seeds are needed for consumption, seed or marketing

During the shelling process, discoloured groundnuts should be removed.

Nutritional value of groundnuts

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>25</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>12</td>
</tr>
<tr>
<td>Fat/Oil</td>
<td>48</td>
</tr>
<tr>
<td>Dietary Fibre</td>
<td>9</td>
</tr>
<tr>
<td>Water</td>
<td>4.26</td>
</tr>
<tr>
<td>Others (Thiamine, Niacin)</td>
<td>1.74</td>
</tr>
</tbody>
</table>

Aflatoxin Management in Groundnuts

Aflatoxins are poisonous substances produced by fungi

Aflatoxin affect quality of produce especially for groundnuts

Factors promoting contamination by Aflatoxin

Pre-harvest:

End of season moisture stress to crop for a period of more than twenty days

Damage of pod for instance growth cracks

Post-harvest:

Harvesting when the crop is over mature

Stacking the produce when moisture levels are high

Insect damage during storage

Storage Haulms with immature pods

Pod rotting due to roof leakage or high moisture levels

Effects of Aflatoxins

Fungal growth causes deterioration of pod quality

Cancer/Hepatitis/Liver cancer in consumers

Reduction in price for produce

Decaying of seeds and no emerged seeds

Affects groundnuts sales and its by-products

How to minimise Aflatoxin contamination?

• Harvest crops on time once they are mature (at the correct stage of maturity)

• Minimise pod damage by insects

• Dry pods to safe moisture levels as soon as possible after harvesting

• Separate discoloured, shrivelled and damaged pods at shelling

• Store pods under dry conditions in cool and well-ventilated storage facilities

• Follow proper drying procedures

• Remove soil from pods before drying

• Good curing practices

Groundnuts standards

<table>
<thead>
<tr>
<th>Purity level</th>
<th>95 percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture content</td>
<td>7-8 percent</td>
</tr>
<tr>
<td>Shelling percentage</td>
<td>Over 65</td>
</tr>
<tr>
<td>Aflatoxin</td>
<td>Not Aflatoxin</td>
</tr>
</tbody>
</table>

Timely harvesting is key for maintaining good quality harvest.

Challenges of early harvesting

• Drop in oil content

• Aflatoxin contamination

• Not saleable, low income

• Shrinkage of seeds

• Weight loss

• Poor quality seeds

Challenges of late harvesting

• Difficult to uproot as pods remain in the soil due to weak pegs

• Yield loss

• Sprouting of less dominant varieties

• Low income

Stages in Post-Harvest Handling of Groundnuts

1. Cleaning

• Shake off all soil from pods to discourage fungal growth

• Removal of soil from pods shortens length of drying period

2.
3.1 Set clear goals
The first step is to set clear goals. These goals may be related to reproductive status, calving/ lambing rates, herd or flock uniformity, supplementary feeding or supplying certain markets. Having set goals for the enterprise, one can then assess current performance in these metrics.

3.2 Decide on the breeding season(s)
When making decisions with regards to duration and timing of the breeding season, livestock producers should consider their specific goals, available forage resources, climatic conditions and market demands.

In the case of cattle, a 90-day breeding season is the gold standard, as it improves age and weight uniformity of calves. Cows and bulls are typically joined for mating at the start of summer when there is abundant grazing. Calving down will occur in spring (September-November), such that cows with calf on foot will benefit from summer grazing.

A second, shorter breeding season can be implemented to give a second chance to cows that failed to conceive during the main breeding season. Such a breeding season can run in May-June for 45-60 days. It can also be used for early mating of some heifers at 18 months, instead of the normal two years.

In sheep and goats, the choice is often between spring and autumn lambing. With spring lambing, tupping is done in autumn (end of March to May) and lambing typically occurs in September to November. High lambing or kidding rates have been observed in spring, since tupping is done when fertility of ewes and does is at peak. Second, lambs and kids born into abundant spring and summer grazing grow fast.

The downside for spring lambing is the need to supplement nutrition to pregnant does and ewes during the dry season, as well as elevated kid mortality rates due to higher parasite and disease loads in summer.

When breeding of does and ewes is synchronized with the onset of the rainy season, lambing will occur in autumn (April to May). This lambing season is associated with higher birth weights, less pre-weaning kid mortality and provision of market ready goats by the festive season.

However, conception rates are lower, which can lead to fewer lambs and kids in autumn. Supplementary feeding is required for lactating ewes and weaned kids during the subsequent dry season.

Accelerated lambing option may be pursued for goats. It involves a fixed mating schedule meant to achieve a lambing or kidding interval of eight months or three lambings in two years. This is an intensive, but highly productive, system that can improve resource use and profitability.

3.3 Develop a mating plan
Once the breeding season has been decided on, it is time to plan how the actual mating program will take place. This can involve strategies on the mating system (pure or cross-breeding) and how breeding females will be mated. Crossbreeding systems involve 2-4 breeds being combined, while pure-breeding is more suited to farmers producing seed-stock. The producer may decide to mate animals using artificial insemination (AI), natural service (NS) or a combination of these two (AI + NS).

The plan must also specify mating ratios, size and number of mating groups, and whether these groups will be single or multi-sire. Maiden ewes and heifers may have to be mated earlier and for longer relative to older cows and ewes.

Other aspects making up the plan may include pre-breeding vaccination programs and breeding soundness examinations (BSE), body condition scores (BCS), pregnancy testing and culling decisions.

3.4 Implementation
Any goals and plans, however noble, may fail on the altar of poor implementation. By the start of the breeding season, everything must be ready, including adequate herd or flock sires (bucks, rams, or bulls), paddocks and nutritional supplements. Preparing your breeding animals for the season is important. This includes carrying out pre-breeding inoculations and vaccinations, testing sires for breeding soundness, building up the requisite body condition scores and getting bulls and bucks into physical fitness.

Newly purchased bulls and bucks must be on the farm at least two months before the breeding season. A BCS of 3.0 – 4.0 (on a scale of 1-5) is desired. The bull or buck’s diet and exercise regime must be managed well. Breeding soundness must be tested before, and during, the breeding season.

In females, maintaining a BCS of 2.5-3.5 during the breeding season will ensure optimum fertility and conception rates.

Mating ratios are important. In goats, one buck may be allocated 40-50 does/ewes. One bull per 25-35 cows or 15-20 heifers may suffice in most areas. It is important to use experienced bulls on heifers since heat is less intense and lasts for a shorter time in heifers compared to older cows.

3.5 Evaluate and adjust
It is important is to evaluate the success of the breeding season and make adjustments as needed to refine the reproductive management plan. Regular monitoring helps to assess activity level of the breeding animals, identify lazy sires and institute corrective measures early.

Cows and ewes/does must be pregnancy checked 2-3 months and one month after the breeding season ends, respectively. Culling decisions can be done on the basis of pregnancy diagnosis results. For instance, there is no good reason for heifers not to be in calf. They should only be culled. Older empty cows may be culled or given a second chance.

With a good reproductive management system, most of the cows must get into calf within the first few weeks of the mating season. It is preferred that up to 60% of calves be born within the first 30 days of the calving season. Calving distribution may vary due to genetics, nutrition, management and climate.

6. Conclusions
By implementing a defined breeding season, livestock producers can optimize herd productivity, improve genetic progress, achieve cost savings and yield economic benefits. The choice of breeding season depends on various factors, including local climate, forage availability, market demands, and specific goals of the farm. Livestock producers should consider their specific circumstances and consult with breeding and reproduction experts or other farmers to plan and implement a breeding season for their operation.

About the author
Eddington Gororo is an animal scientist, researcher and academic working for Chinhoyi University of Technology, Zimbabwe. He blogs at http://letsfarm-zw.com and can be contacted on +263 77 392 6375 or gororoeddington@gmail.com.